I Claim

- A medical diagnostic device for measuring an analyte concentration or property of a biological fluid, comprising
 - a sample inlet for introducing a sample of the biological fluid into the device;
 - a \first capillary channel for conveying the sample from the inlet to a branching point;
 - a capillary connecting channel for conveying a first part of the sample from the branching point through a measurement area, in which is measured a physical parameter of the sample that is related to the analyte concentration or property of the fluid, and to a first stop junction;
 - a capillary bypass channel for conveying a second part of the sample in a first direction from a first region, proximate to the branching point, to an overflow region, distal to the branching point, the first region having a capillary dimension in a second direction substantially perpendicular to the first direction:
 - a second stop junction in the bypass channel, comprising a boundary region that
 - i) separates the first and overflow regions,
 - has a second predetermined dimension in the second direction that is greater than the capillary dimension, and

10

5

25

30

501

iii) forms an angle that points toward the first region, whereby any excess sample that enters the sample inlet will pass through the second stop junction into the overflow region.

500

2. The device of claim 1, further comprising a suction device in fluid communication with the first and second stop junction, for drawing sample from the sample inlet toward stop junctions.

20

5

3. The device of claim 2, in which the device comprises a first layer and second layer, at least one of which has a resilient region over at least a part of its area, separated by an intermediate layer, and in which

a) cutouts in the layers form, with the layers, the sample inlet, first channel, connecting channel, measurement area, and bypass channel;

b) the suction device comprises a bladder that

. •

i) is distal from the sample inlet,ii) comprises at least a part of the resilient region, and

iii) has a volume that is at least about equal to the combined volume of the first channel, measurement area, connecting channel,

25

c) the first and second stop junctions comprise coinciding holes in the first, second, and intermediate layers that are sandwiched by a third layer and fourth layer.

and bypass channel, and

30

10

- 4. The device of claim 3 in which at least the first or second layer is substantially transparent adjoining the measurement area, and the physical parameter that is measured is obtical transmission.
- The device of claim 3 in which the physical parameter of the sample undergoes a change in the measurement area.
- The device of claim 5 in which the measurement area contains a composition that facilitates blood clotting, the biological fluid is whole blood, and the property being measured is prothrombin time.
- 7. The device of claim 6 in which the composition comprises thromboplastin.
- The device of claim 6 further comprising at least 8. one additional fluidic path from the branching point to the bladder, each such alternate path including a corresponding measurement area and stop junction.
- 9. The device of claim 8 in which a first alternate path is to a measurement area that overcomes the effect of an anticoagulant and a second alternate path is to a measurement area that partially overcomes the effect of an anticoagulant.

5

25



5

10. The device of claim 9 in which the measurement area in the first alternate path comprises thromboplastin, bovine eluate, and recombinant Factor VIIa and the measurement area in the second alternate path comprises thromboplastin and bovine eluate.